

# **Historic, Archive Document**

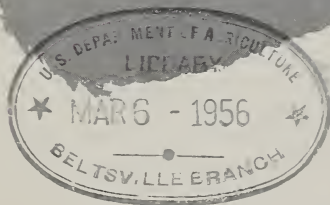
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# the Gypsy Noth how we fight it



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U. S. DEPARTMENT OF AGRICULTURE



# the Gypsy Moth

# how we fight it

The gypsy moth,<sup>1</sup> a leaf-eating insect, does hundreds of thousands of dollars worth of damage each year to trees in a 38-million-acre region in the Northeastern States.

The insect is confined to this region by control programs. If uncontrolled, it could spread to every State. Protection of the extensive oak forests of the Appalachian Mountains and of the South and Midwest is a special objective of control efforts.

Only coordinated programs carried out by organized groups—Federal, State, and local—can control the gypsy moth. But the effectiveness of these programs depends on the cooperation of individuals, particularly shippers, land owners, and tourists in the infested region.

## ORIGIN

A small package mailed from France to Medford, Mass., in 1869 brought the gypsy moth to the United States. The package contained a handful of egg clusters.

The eggs were imported by a French scientist who hoped to develop a hardy race of silk-producing insects by crossing gypsy moths with silkworm moths. The eggs hatched in his laboratory, and some of the larvae escaped. The pest became established in nearby residential and wooded areas.

Twenty years later the infested area covered about 360 square miles in eastern Massachusetts. Trees were repeatedly defoliated in several towns around Boston.

The infested region now includes most of New England and a good-sized section in eastern New York.

## HOW THE MOTHS DEVELOP

The gypsy moth has four life stages: Egg, larva (or caterpillar), pupa (or resting stage), and adult (moth). It produces one generation a year.

Female moths lay eggs in late July and early August on tree trunks, under loose bark or leaves, under rocks, on stone walls, and in other shady, protected places where they are difficult to locate.

The eggs are in clusters, each of which is about  $\frac{3}{4}$  inch wide and about 1 inch long. There are about 400 eggs to a cluster. The clusters, which are covered with hairs from the body of the female, look like buff felt.

<sup>1</sup> *Porthetria dispar*.

When warm weather arrives, usually in early May, the eggs hatch. The larvae seek food soon after hatching. They feed voraciously on foliage, and grow rapidly. By mid-June they are  $1\frac{1}{2}$  to 2 inches long. They can be identified by pairs of red and blue dots on the back.

In late June or early July the larvae change into pupae, and these become moths. The moths emerge from the pupal cases in 10 days to 2 weeks.

Emergence is at its height in July, and continues as late as the middle of August. The male moth has dark-brown forewings. Because of his slender body and a wingspread of about  $1\frac{1}{2}$  inches, he is a strong flier, able to range far as he searches for a female with which to mate. The female is white with black markings. Although she has a 2-inch wingspread, her heavy body prevents her from flying. She crawls to a shady spot, lays eggs, and dies. Moths do not eat.

## SPREAD

Wind is the principal agent in the natural spread of gypsy moths. Long-distance spread by the wind occurs when larvae are first hatched, usually before they feed on foliage.

Larvae may be picked up and swirled as high as 2,000 feet, where they are often caught in crosscurrents and blown in the direction opposite to the direction of surface winds.

Egg clusters on debris may be carried many miles by high water.

Artificial spread usually occurs through the transportation of egg clusters on woody plants, forest products, and stone and quarry products. Less often the insect is similarly transported in its other life stages.

## NATURE OF DAMAGE

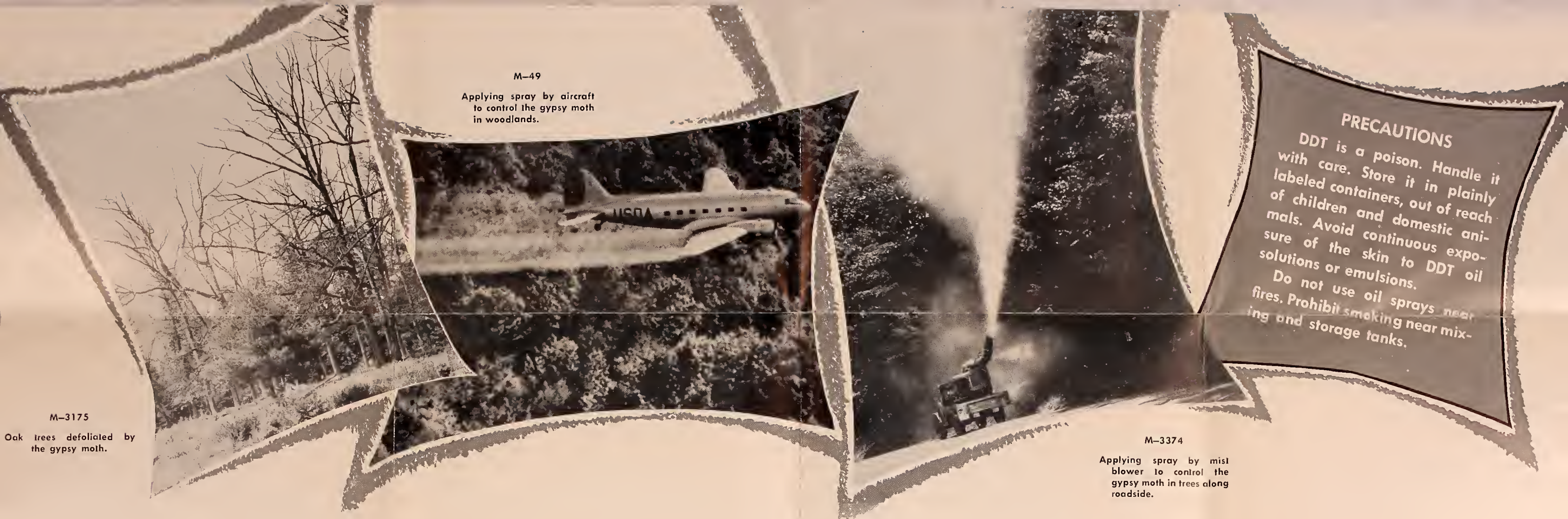
Defoliation by larvae retards the growth of trees and reduces their marketability and value as timber. Often it kills trees. Some trees survive several defoliations before they die. Hemlock usually dies after one defoliation.

Trees weakened by defoliation are susceptible to diseases and attacks of other insects, notably bark borers.

The loss of trees affects stream flow, increases fire and erosion hazards, reduces land values, and destroys wildlife habitat. Where openings are left in the forest stand, the forest floor dries, and weed trees reproduce rapidly.







**PRECAUTIONS**  
DDT is a poison. Handle it with care. Store it in plainly labeled containers, out of reach of children and domestic animals. Avoid continuous exposure of the skin to DDT oil solutions or emulsions. Do not use oil sprays near fires. Prohibit smoking near mixing and storage tanks.

Trees most commonly infested by gypsy moth larvae are: Oak, poplar, willow, gray birch, paper birch, red birch, linden, apple, pear, speckled alder, and hawthorn. To a lesser degree, larvae feed on: Elm, larch, maple, black and yellow birch, cherry, hickory, black gum, hornbeam, and sassafras.

### CONTROL PROGRAMS

Massachusetts began efforts to control the gypsy moth in 1889. The U. S. Department of Agriculture began control work in 1906, after the pest had become an interstate problem. By 1912, all the States in the infested region were in the fight.

#### Early Control Work

Early control work consisted primarily in spraying with lead arsenate. Most of this was done in badly infested residential areas.

Efforts were made also to prevent the shipment of infested plants to uninfested places. This phase of control was strengthened by the Federal Plant Quarantine Act of 1912.

This Act gave the Secretary of Agriculture power to issue and enforce plant quarantines to prevent the interstate transportation of known carriers of insect pests and plant diseases.

Soon after this Act was passed, regulations were issued under its authority to prohibit the shipment from the infested region of plants and plant products known to be carriers of gypsy moth eggs and larvae.

#### Present Cooperative Program

Despite the control actions of the Federal Government and the States, the gypsy moth continued to spread. By 1922 it had reached eastern New York.

In 1923 the Federal Government organized a new con-

trol program, to be carried out in cooperation with States and localities in or near the infested region. This program, which still is in operation, provides for strict enforcement of quarantines in the generally infested region and for detection and destruction of infestations along the border of that region.

### CONTROL METHODS

Surveys, spraying with DDT, and quarantines are the main methods of control used in the Federal-State cooperative program.

#### Surveys

Surveys are made over extensive areas to find whether gypsy moth infestation exists and to check on the effectiveness of spraying operations.

Basic tools in most surveys are special traps, each baited to attract male moths within a radius of about half a mile. The bait is an attractant that is extracted from the sex glands of female moths. The required amount, held in a cartridge made of corrugated or filter paper, is placed inside each trap. The trap is lined with sticky material that catches the moths.

The most satisfactory traps are made from cans about 7 inches long and 4 inches in diameter. The ends are covered with inverted waxed paper cones with holes in the center to permit moths to enter the trap.

The traps are hung by wires to trees not later than early July, before the moths emerge from their pupal cases. The traps are removed in late August or early September. They are inspected every 7 to 10 days; moths are removed and the sticky material is renewed at each inspection.

In the fall and winter, scouting surveys are made in vicinities in which moths were trapped during the summer. Their purpose is to locate the infestations from which the trapped moths originated. Surveys also are made in areas that were not trapped, but in which infestation is known

to occur, to determine the extent and intensity of infestation.

Other surveys are made at points where infestations could be started by egg clusters or larvae brought in by vehicles. These surveys are confined largely to through highways, population centers, transportation terminals, recreation areas, State parks, and similar locations.

#### Spraying With DDT

DDT spray applied during the larval period—from about May 1 to June 15—effectively controls the gypsy moth. Aircraft or ground mist blowers are used to apply the spray.

If properly applied, the spray is not harmful to people, domestic animals, wildlife, or plants.

**Aircraft Spraying.**—For treating extensive areas, a DDT oil solution is dispersed from aircraft as a mist spray, at a minimum rate of 1 gallon per acre.

If *extermination* of the moth is the objective, the solution is made up of 1 pound of technical grade DDT per gallon of oil (about 12 percent by weight).

If *suppression* of an outbreak in the generally infested region is the objective, the solution is made up of ½ pound of technical grade DDT per gallon of oil (about 6 percent by weight).

To get uniform coverage, the spray-plane pilot must take into account the effective swath width and the forward speed of the plane.

A single-engine aircraft flying 100 feet above the tree-tops effectively sprays a swath of 100 to 130 feet. It can treat 250 to 300 acres an hour.

A multimotored aircraft flying 200 feet above the tree-tops ordinarily sprays effectively a swath of 500 feet. It can treat 1,500 to 4,000 acres per hour, the number of acres treated depending on the load capacity of the plane and the ferrying distance from the servicing airport.

Multimotored aircraft are particularly valuable and eco-

nomical in spraying large areas of unbroken forest. Also, for public safety, they are the only planes that should be used for spray treatments over populated places.

Commercial pest-control organizations do most of the spraying called for by the Federal-State gypsy moth control program. Usually a State or the Federal Government contracts for the pest-control organization to provide the spray and to apply it from aircraft. A few States possess equipment for mixing DDT powder with solvent and diluent; these States contract only for aerial application of the spray.

**Note.**—For additional information about aircraft spraying, see Farmers' Bulletin 2062, *How To Spray the Aircraft Way*.

**Spray for Ground Mist Blowers.**—Ground mist blowers are used for applying DDT to trees and other woody plants in nurseries, along roadsides, and in residential and recreational areas.

A DDT emulsion spray of 12-percent strength is recommended for mist-blower spraying. DDT emulsifiable concentrates that can be diluted with water to make an emulsion spray are available in drum lots from many chemical and petroleum companies.

Oil DDT solutions are not suitable for use in ground mist blowers because oil solutions damage the foliage of many kinds of plants when sprayed at such close range.

**Spraying in Nurseries.**—Many nurserymen in the gypsy moth region have their nurseries sprayed under the supervision of Federal plant-quarantine inspectors. From the point of view of the quarantine authorities, such spraying is for the purpose of quarantine enforcement. A heavy dosage is applied—2 pounds of DDT per acre. The heavy dosage insures elimination of infestation.

Products from nurseries sprayed under the supervision of quarantine inspectors are eligible for gypsy moth quarantine certification, which makes it possible to ship the products outside the infested region.

Most nurserymen have this spraying done by helicopters. Some have it done by mist blowers.

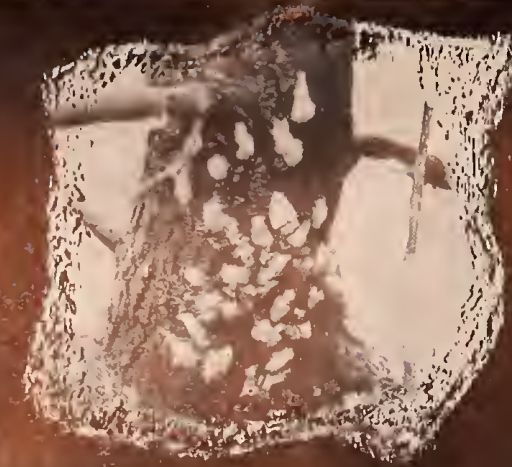
*Fight Your Insect Enemies*

*Fight Your Insect Enemies*



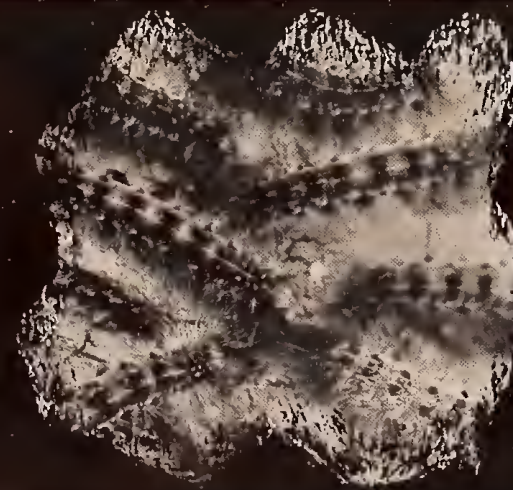






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Female gypsy moths depositing eggs on tree trunk.



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Gypsy moth larvae.



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Gypsy moth pupae.



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Female gypsy moth depositing eggs on burlap. A male is nearby.

A motion picture on control of the gypsy moth is available for loan from the Plant Pest Control Branch, U. S. Department of Agriculture, Box 72, Greenfield, Mass.

## Quarantines

Federal and State quarantines are maintained to prevent artificial spread of the insect to uninfested areas. They regulate the transportation from the infested area of materials that may harbor moth forms.

Regulated materials consist principally of—

- **Timber and timber products, including lumber, poles, logs, cordwood, and pulpwood.**
- **Plants with woody stems, and parts of such plants.**
- **Christmas trees.**
- **Stone and quarry products.**

Federal-State inspectors issue certificates for the transportation of regulated materials under one or more of the following conditions:

- **The materials have not been exposed to infestation.**
- **They have been inspected and found to be free from infestation.**
- **They have been treated by approved methods under the observation of an inspector.**
- **They have been grown, produced, manufactured, stored, or handled in such a way that, in the judgment of the inspector, no infestation will be transmitted by them.**

Inspection and certification services are available throughout the year, free of charge. Shippers and others who plan to send or take regulated materials out of the infested area should get in touch with local inspectors, or with the Plant Pest Control Branch, U. S. Department of Agriculture, Box 72, Greenfield, Mass.

One means of artificial spread not prevented by enforcement of quarantines is the transportation of moth forms on automobiles, trailers, and trucks. Drivers should examine such vehicles and remove any moth forms before traveling from an infested to an uninfested area. This examination is particularly important if the vehicles have been parked in an area of heavy infestation at any time during the period from early May to late August.

This publication was prepared by the Plant Pest Control Branch, Agricultural Research Service. It supersedes EC-8, The New Cooperative Gypsy Moth Control Program.

Washington, D. C.

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